

I claim:

1. A mentation test method comprising: displaying randomly distributed given number of targets to be sequentially pointed according to a prescribed order on a screen of a display means; measuring the search response time required for a test subject to search each target by requesting the subject to sequentially point the targets according to a prescribed order; and calculating mentation of the test subject based on the measured values.

2. The mentation test method according to Claim 1, wherein the given number of the targets are displayed on a screen of an electronic control display means, and the test subject points the targets by pressing the locations corresponding to the targets on a touch panel overlaid on the screen.

3. The mentation test method according to Claim 1 or 2, wherein the targets are erased from the screen when they are pointed in a correct order.

4. The mentation test method according to Claim 3, wherein dummy targets are displayed in place of the erased targets at the positions where the erased targets have been located or at random positions when the targets are pointed in a correct order.

5. The mentation test method according to Claim 4, wherein at least one of the color, shape and size of the target are different from those of the dummy target.

6. The mentation test method according to Claim 4 or 5, wherein marks indicating the order of pointing are displayed as the targets or in addition to the targets, and marks other than those that have been already

displayed are displayed as the dummy targets or in addition to the dummy targets.

7. The mentation test method according to any one of Claims 1 to 6, wherein display positions of the remaining targets that have not been pointed yet change every time when the other targets have been pointed in a correct order.

8. The mentation test method according to Claim 1 for executing, in a prescribed order,

a test 1 in which a given number of the targets to be pointed in a prescribed order are displayed on the screen of the display means by being randomly distributed, the test subject is requested to point each target in a prescribed order, and a dummy target having a different color from the target is displayed in place of the pointed target at the position of the pointed target when the target is pointed in a correct order;

a test 2 in which a given number of the targets to be pointed in a prescribed order are displayed on the screen by being randomly distributed, the test subject is requested to point each target in a prescribed order, and a dummy target is displayed in place of the pointed target at a randomly selected position when the target has been pointed in a correct order; and

a test 3 in which a given number of the targets to be pointed in a prescribed order are displayed on the screen by being randomly distributed, the test subject is requested to point each target in a prescribed order, and a dummy target is displayed in place of the pointed target at a randomly selected position when the target has been pointed in a correct

order, besides changing the display positions of each target and dummy target,

wherein the search response time required for searching the target in each test is measured for every targets, and mentation age of the test subject's brain is calculated based on the measured values.

9. The mentation test method according to Claim 8 comprising the steps of: initially displaying 25 targets in each test; disregarding the measured values for the first to fifth targets; and calculating the mentation age of the test subject's brain according to the equations 1 and 2 below based on the first half of the test 1 in which the search times for the 6<sup>th</sup> to 15<sup>th</sup> points are summarized, the last half of the test 2 in which the search times for the 16<sup>th</sup> to 25<sup>th</sup> points are summarized, and the first half of the test 3 in which the search times for the 6<sup>th</sup> to 15<sup>th</sup> points are summarized, and the last half of test 3 in which the search times for the 16<sup>th</sup> to 25<sup>th</sup> points are summarized:

Equation 1

$$X = 0.0154 \times (\text{first half of task A}) + 0.00978 \times (\text{last half of task C}) - 0.005535 \times (\text{first half of task C}) + 0.003645 \times (\text{last half of task B}) - 3.681 (\text{distinction of sex}) - 6.612$$

wherein the term "distinction of sex" is substituted with 1 when the test subject is a male, and 2 when the test subject is a female, and

Equation 2

$$\text{ATMT calculated age} = -0.0091X^2 + 1.8771X - 19.192$$

10. The mentation test method according to Claim 8 or 9, wherein the search response time for each test is displayed on the screen after

completing the entire tests.

11. The mentation test method according to any one of Claims 8 to 10, wherein the calculated mentation age of the test subject's brain is displayed on the screen after completing the entire tests.

12. The mentation test method according to Claim 1 for executing, in a prescribed order, the test 2 in which a given number of the targets to be pointed in a prescribed order are displayed on the screen by being randomly distributed, the test subject is requested to point each target in a prescribed order, and a dummy target is displayed in place of the pointed target at a randomly selected position when the target has been pointed in a correct order; and the test 3 in which a given number of the targets to be pointed in a prescribed order are displayed on the screen by being randomly distributed, the test subject is requested to point each target in a prescribed order, and a dummy target is displayed in place of the pointed target at a randomly selected position when the target has been pointed in a correct order, while changing the display positions of each target and dummy target, wherein the search response time required for searching the target in each test is measured for every targets, the ratio of the search response time in test 2 relative to the search response time in test 3 is calculated, and presence of dementia or prediction probability of onset of dementia is judged from the calculation results.

13. The mentation test method according to Claim 12 comprising the steps of: initially displaying 25 targets in each test; disregarding the measured values for the first to fifth targets; and diagnosing a patient as a normal or a dementia patient based on whether the ratio of the search

response time in the last half of the test 2 relative to the search response time in the last half of the test 3 is 0.85 or less, wherein the order of the 6<sup>th</sup> to 15<sup>th</sup> targets is defined as a first half of the test and the order of the 16<sup>th</sup> to 25<sup>th</sup> targets is defined as a last half of the test.

14. The mentation test method according to Claim 12 or 13 wherein, when the ratio of the search response time in the last half of test 2 relative to the search response time in the last half of test 3 is 0.85 or less, the ratio or the percentage calculated based on the ratio is displayed on the screen as a prediction probability of onset of dementia after completing the entire tests.

15. The mentation test method according to any one of Claims 12 to 14, wherein the search response time in each test is displayed on the screen after completing the entire tests.

16. A mentation test apparatus comprising: a display means for displaying images by electronic control; a transparent touch panel overlaid on the screen of the display means; an image control means for randomly disposing and displaying a given number of targets to be pointed in a prescribed order on the screen by controlling the display means, and for erasing the targets that have been pointed in a correct order when a test subject points the target by pressing the position corresponding to each target on the touch panel in a prescribed order; a time counter for measuring the search response time required for the test subject for searching the targets in a correct order, and/or the search response time required for the test subject for searching a given number of targets arranged in a sequential order, and a processing means for calculating the mentation of the test

subject based on the search response time measured by the time counter.

17. The mentation test apparatus according to Claim 16, wherein the image control means comprises a function for allowing the display means to display the dummy targets at the positions where the targets have been erased or at random positions in place of the targets that have been erased.

18. The mentation test apparatus according to Claim 17, wherein the image control means comprises a function for allowing the display means to display the dummy targets being different in at least one of the color, shape and size in place of the targets that have been erased.

19. The mentation test apparatus according to any one of Claims 16 to 18, wherein the image control means comprises a function for allowing the display means to display the marks indicating the order of pointing as the targets or in addition to the targets, and for allowing the display means to display the marks other than the marks that have been already displayed as dummy targets in place of the erased targets at the positions of the targets that have been erased or at random positions, or in addition to the positions of the targets that have been erased or in addition to the randomly displayed dummy targets.

20. The mentation test apparatus according to any one of Claims 16 to 19, wherein the image control means comprise a function for allowing the display means to display each target that has not been pointed yet by changing its display position every time when the other targets have been pointed in a correct order.

21. The mentation test apparatus according to Claim 16 comprising a function for allowing the display means to erase a target from

the screen when the target is pointed in a correct order, and to display a dummy target having a different color at the position of the target in place of the target that has been erased; a function for allowing the display means to erase a target from the screen when the target is pointed in a correct order, and to display a dummy target at random positions in place of the target that has been erased; a function for allowing the display means to erase a target from the screen when the target has been pointed in a correct order, and to display a dummy target at random positions in place of the target that has been erased, while allowing the display means to display each target and dummy target by changing their display positions; and a selection means for making any one of the functions effective, wherein the mentation age of the test subject's brain is calculated by the processing means based on the search response time measured by the time counter in the test using each function.

22. The mentation test apparatus according to Claim 21, wherein the image control means allows the display means to display the search response time of each target measured by the time counter in each test after completing the entire tests.

23. The mentation test apparatus according to Claim 21 or 22, wherein the image control means allows the display means to display the mentation age of the test subject's brain calculated by the processing means after completing the entire tests.

24. The mentation test method according to Claim 16 comprising: an image control means for executing, in a prescribed order, the test 2 by allowing the display means to erasing a target from the screen when the target is pointed in a correct order, and to display a dummy target on the

screen at random positions in place of the target that has been erased, and the test 3 by allowing the display means to erase a target from the screen when the target is pointed in a correct order, and to display a dummy target at random positions on the screen in place of the target that has been erased, while allowing the display means to display each target and dummy target by changing their display positions; a processing means for calculating the degree of contraction of the search response time by a working memory for parallel processing of search and memory of positions based on the search response time of each target measured by the time counter in each test; and a diagnosis means for diagnosing presence of dementia or prediction probability of onset of dementia based on the calculation results.

25. The mentation test apparatus according to Claim 24, wherein the image control means allows the display means to display the search response time for each target in each test measured by the time counter after completing the entire tests.

26. The mentation test apparatus according to Claim 24 or 25, wherein the image control means allows the display means to display the results of diagnosis by the diagnosis means after completing the entire tests.

27. The mentation test apparatus according to any one of Claims 16 to 26 comprising a printer for printing the test results.